Roll No. LHR. (To be filled in by the candidate)

(Academic Sessions 2015 – 2017 to 2017 – 2019)

PHYSICS 219-(INTER PART – II) Time Allowed : 20 Minutes

Q.PAPER – II (Objective Type) GROUP – I Maximum Marks : 17

PAPER CODE = 8475

Note : Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink in the answer-book. Cutting or filling two or more circles will result in zero mark in that question.

1-1	In p-type substances, the majority charge carriers are :			
	(A) Electrons	(B) Protons	(C) Holes	(D) Neutrons
2	Commutators are used in :			
	(A) D.C. generators	(B) A.C. generators	(C) A.C. motor	(D) A.C. rotator
3	The factor $\frac{h}{m_o c}$ in Compton equation has the dimension of :			
	(A) Pressure	(B) Length	(C) Mass	(D) Momentum
4	Sec/Ohm is equal to :			
	(A) Farad	(B) Coulomb	(C) Joule	(D) Ampere
5	Number of neutrons in $^{235}_{92}U$:			
	(A) 92	(B) 235	(C) 143	(D) 327
6	The sum of negative and positive peak values is :			
	(A) Average value	(B) rms value	(C) Peak value	(D) p-p value
7	The magnetic force is simply a :			
	(A) Reflecting force	(B) Restoring force		
	(C) Deflecting force	(D) Gravitational force		
8	If a charged body is moved against the electric field, it will gain :			
	(A) P.E.	(B) K.E	(C) Mechanical energy	(D) Electrical potential energy
9	The common emitter current amplification factor β is given by :			
	(A) $\frac{I_C}{I_E}$	(B) $\frac{I_C}{I_B}$	(C) $\frac{I_E}{I_B}$	(D) $\frac{I_B}{I_C}$
10	Energy of the 4th orbit in hydrogen atom is :			
	(A) – 2.51 eV	(B) – 3 .50 eV	(C) – 13.6 eV	(D) – 0.85 eV
11	Resistance in choke is :			
	(A) Large	(B) Very small	(C) Zero	(D) Infinite
12	The unit of $\overline{E}$ is NC^{-1} and that of $\overline{B}$ is $NA^{-1}m^{-1}$ then the unit of $\frac{\overline{E}}{\overline{B}}$ is :			
	(A) ms^{-2}	(B) $m^{-1}s^{-1}$	(C) ms	(D) ms^{-1}
13	X-rays are the electromagnetic radiations having the wavelength in range :			
	(A) $10^{-12}m$	(B) $10^{-10}m$	(C) $10^{-8}m$	(D) $10^{-6}m$
14	To construct a step up transformer :			
	(A) $N_s > N_p$	(B) $N_s < N_p$	(C) $N_s = N_p$	(D) $N_s N_p = 1$
15	When a wire of resistance R is cut into two equal parts then resistance of each wire is :			
	(A) Double	(B) Half	(C) Remain same	(D) One forth
16	The gain of non-inverting amplifier is :			
	(A) $1+\frac{R_2}{R_1}$	(B) $1+\frac{R_1}{R_2}$	(C) $\frac{-R_2}{R_1}$	(D) $\frac{-R_1}{R_2}$
17	The energy of photon is given by :			
	(A) $\frac{1}{2}mv^2$	(B) $v_o e$	(C) $m_o c^2$	(D) hf

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PHYSICS 219-(INTER PART – II) Time Allowed : 2.40 hours

PAPER – II (Essay Type) GROUP – I Maximum Marks : 68

SECTION – I

2. Write short answers to any EIGHT (8) questions : **16**

(i) State Gauss's law and write its mathematical relation.

(ii) Define electron volt and show that $1\,eV = 1.6\times10^{-19}\,J$.

(iii) Electric lines of force never cross. Why?

(iv) Do electrons tend to go to region of high potential or of low potential?

(v) State Lorentz force and write its formula.

(vi) Write two uses of cathode ray oscilloscope.

(vii) How can you use a magnetic field to separate isotopes of chemical element?

(viii) Why the resistance of an ammeter should be very low?

(ix) How the induced current can be increased?

(x) What is motional emf and write its mathematical relation?

(xi) Does the induced emf in a circuit depend on the resistance of the circuit? Explain.

(xii) Show that ε and $\frac{\Delta\phi}{\Delta t}$ have the same units.

3. Write short answers to any EIGHT (8) questions : **16**

(i) Define conventional current and solar cell.

(ii) Define electrolysis and basic principle of electroplating.

(iii) Why does the resistance of a conductor rise with temperature?

(iv) Define peak value and peak to peak value of voltage or current.

(v) A sinusoidal current has rms of 10A. What is the peak value?

(vi) What are superconductors?

(vii) What is meant by para, diamagnetic substances?

(viii) What is meant by strain energy?

(ix) Draw the truth table of XNOR gate.

(x) Why ordinary silicon diodes do not emit light?

(xi) Why is the base current in a transistor very small?

(xii) Define intrinsic and extrinsic semi-conductor.

4. Write short answers to any SIX (6) questions : **12**

(i) Will higher frequency light eject greater number of electrons than low frequency light?

(ii) Photon A has twice the energy of photon B. What is the ratio of momentum of A to that of B?

(iii) What is the energy of photon in a beam of infrared radiation of wavelength 1240 nm?

(iv) What are the advantages of LASER over ordinary light?

(v) Can the electron in ground state of hydrogen absorb a photon of energy 13.6 eV and greater than 13.6 eV?

(vi) Define the isotopes of an element. Write down the isotopes of hydrogen.

(Turn Over)

Roll No. LHR. (To be filled in by the candidate) 2019

(Academic Sessions 2015 -- 2017 to 2017 – 2019)

PHYSICS 219-(INTER PART – II) Time Allowed : 20 Minutes

Q. PAPER – II (Objective Type) GROUP – II Maximum Marks : 17

PAPER CODE = 8478

Note : Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink in the answer-book. Cutting or filling two or more circles will result in zero mark in that question.

1-1	The life time of an electron in an excited state is about $10^{-8}s$. What is its uncertainty in energy during this time : (A) $6.63\times10^{-34}J$ (B) $9.1\times10^{-31}J$ (C) $1.05\times10^{-26}J$ (D) $7.2\times10^{-15}J$
2	The velocity of an oscillating charge as it moves to and fro along the wire is : (A) Infinite (B) Constant (C) Changing (D) Zero
3	The value of $\frac{e}{m}$ is smallest for : (A) Proton (B) Electron (C) β-particle (D) Positron
4	Which factor does not affect the conductivity of PN-junction diode : (A) Doping (B) Temperature (C) Voltage (D) Pressure
5	At what frequency will an inductor of 1.0 H have a reactance of 500Ω : (A) 50 Hz (B) 80 Hz (C) 500 Hz (D) 1000 Hz
6	It is required to suspend a proton of charge 'q' and mass 'm' in an electric field the strength of the field must be : (A) $E=\frac{mg}{qv}$ (B) $E=\frac{mg}{q}$ (C) $E=\frac{q}{mg}$ (D) $E=\frac{qv}{B}$
7	The binding energy per nucleon is maximum for : (A) Hydrogen (B) Nitrogen (C) Uranium (D) Iron
8	Henry is equal to = (A) VSA^{-1} (B) $VS^{-1}A$ (C) $V^{-1}S^{-1}A$ (D) $V^{-1}S^{-1}A^{-1}$
9	The numerical value of Stefen's constant is : (A) 5.67×10^{-8} (B) 2.9×10^{-3} (C) 6.63×10^{-34} (D) 1.6×10^{-19}
10	The electrostatic force between two charges is 42 N. If we place a dielectric of $\varepsilon_r=2.1$ between the charges then the force become equal to : (A) 42 N (B) 84 N (C) 20 N (D) 2 N
11	Good conductors have conductivities of the order of : (A) $10^{-7}(\Omega m)^{-1}$ (B) $10^{7}(\Omega m)^{-1}$ (C) $10^{2}(\Omega m)^{-1}$ (D) $10^{-2}(\Omega m)^{-1}$
12	The value of charge on 1.0×10^{7} electrons is : (A) $1.6\times10^{-12}C$ (B) $1.6\times10^{+11}C$ (C) $1.6\times10^{-19}C$ (D) $1.6\times10^{+19}C$
13	The numerical value of Rydberg's constant is : (A) 1.0974×10^{7} (B) 1.0974×10^{-7} (C) 1.0974×10^{14} (D) 1.0974×10^{-14}
14	The Boolean expression of NAND gate is : (A) $X=A.B$ (B) $X=\overline{A}$ (C) $X=\overline{A.B}$ (D) $X=A+B$
15	By mass spectrograph we can find the value of mass by using formula : (A) $m=\left(\frac{e^2r^2}{2V}\right)B^2$ (B) $m=\left(\frac{er^2}{2V}\right)B^2$ (C) $m=\left(\frac{eV}{2r^2}\right)B$ (D) $m=\left(\frac{eV^2}{2r}\right)B$
16	Maximum emf generated in a generator is : (A) $\varepsilon_o=\varepsilon\sin\theta$ (B) $\varepsilon=\varepsilon_o\sin\theta$ (C) $\varepsilon_o=N\omega AB\sin\theta$ (D) $\varepsilon_o=N\omega AB$
17	The unit of $\vec{E}$ is NC^{-1} and that of $\vec{B}$ is $NA^{-1}m^{-1}$ then the unit of $\frac{E}{B}$ is : (A) ms^{-2} (B) ms (C) $m^{-1}s^{-1}$ (D) ms^{-1}

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SECTION – I

2. Write short answers to any EIGHT (8) questions : 16

(i) What is electric intensity? What is its SI unit?

(ii) Show that $\frac{1\,\text{volt}}{1\,\text{meter}} = \frac{1\,\text{Newton}}{1\,\text{Coulomb}}$

(iii) Describe the force or forces on a positive point charge when placed between parallel plates with similar and equal charges.

(iv) Do electrons tend to go to region of high potential or of low potential?

(v) Describe the change in the magnetic field inside a solenoid carrying a steady current I, if the length of the solenoid is doubled but the number of turns remains the same.

(vi) What is CRO? What is the function of grid in CRO?

(vii) Define ammeter. How can we increase the range of an ammeter?

(viii) Suppose that a charge q is moving in a uniform magnetic field with a velocity V. Why is there no work done by the magnetic force that acts on the charge q?

(ix) State Faraday's law of electromagnetic induction and also write expression for it.

(x) Define mutual inductance of the coils and also define its unit henry.

(xi) Does the induced emf in a circuit depend on the resistance of the circuit? Does the induced current depend on the resistance of the circuit?

(xii) In a transformer, there is no transfer of charge from the primary to secondary. How is, then the power transferred?

3. Write short answers to any EIGHT (8) questions : 16

(i) Define temperature coefficient of resistance and write its formula.

(ii) A potential difference is applied across the ends of a copper wire. What is the effect on the drift velocity of free electrons by decreasing the length and the temperature of the wire?

(iii) Is the filament resistance lower or higher in a 500 w, 220 v light bulb than in a 100 w, 220 v?

(iv) What is impedance? Write its formula.

(v) A sinusoidal current has rms value of 10A. What is the maximum or peak value?

(vi) What is meant by A.M. and F.M.?

(vii) Differentiate between ductile and brittle substances.

(viii) Define stress and strain. What are their SI units?

(ix) What is meant by hysteresis loss?

(x) What is depletion region?

(xi) How does the motion of an electron in a n-type substance differ from the motion of holes in a p-type substance?

(xii) What is the principle of virtual ground?

4. Write short answers to any SIX (6) questions : 12

(i) Define Compton effect. At what angle Compton shift becomes equal to the Compton wave length?

(ii) As a solid is heated and begins to glow, why does it first appear red?

(iii) What happens to radiation energy from a blackbody if its temperature is doubled?